

News

Mineral Physics Machines

The field of mineral physics will benefit from an era of big physics machines that will produce intense beams of X rays, neutrons, and high-energy particles. The new super accelerators are being built as tools for high-energy physics experiments and for materials science research.

Mineral physics studies are among the most sophisticated to be conducted. High-intensity X rays will be used to solve complex crystal structures, to detail the steps of fast mineral phase changes, and to penetrate to the sample chambers of high-pressure cells. Neutron beams powerful enough to penetrate surface layers of the earth's crust will be used to probe for mineral deposits.

Notable among the machines of this forthcoming era are the new synchrotrons and the "Desertron," a device so large it requires large, wide-open spaces. The new machines have recently received strong votes of support by the Department of Energy panels and by Congressional Committees, but only after stirring considerable controversy [see *Eos*, January 3, 1984, p. 1, for a report on the controversy surrounding academic science lobbying].

Evidently a lot is at stake for the United States in the world of high-energy particle studies. The superconducting Super Collider (SSC), or Desertron, has evolved at the expense of the Isabella superconducting proton-proton collider (officially, Colliding Beam Accelerator), which has been under construction at the Brookhaven National Laboratory since 1978 at a cost of over \$200 million. Isabella, which had been plagued with design problems, is now considered obsolete even though it has not been completed. Isabella would have had a ring diameter of 3.6 km (actually already constructed). The SSC may have a ring diameter on the order of 160 km.

An example of a newly proposed and politically controversial accelerator that will have mineral physics applications is the new synchrotron light source at the National Center for Advanced Materials (NCAM) at the Lawrence Berkeley Laboratory in California. The synchrotron as originally planned was to be built as a central part of a large, materials science research and development laboratory. Controversy has resulted from the suddenness with which the project and its funding were announced in early 1983. The entire cost was announced as \$84 million, to be spread over 5 years. No peer review or competitive structure was employed by the Office of Management and Budget, and broad criticism has been voiced. The result has been that the synchrotron has been detailed for separate consideration and review by a special panel put together by the Department of Energy from which the funds are to be derived.

The concept of having research laboratories located next to (actually attached to) a synchrotron light source has a lot to be said for it. The synchrotron X ray beams in such demand for diffraction, fluorescence, fine line structure, and other physical measurements of minerals and other materials are only available to an investigator for short periods requiring advance notice. One to three days of beam-time per year is about the maximum currently available. For protection from the intense radiation, all experiments and measurements must be done by remote control, and thus an investigator must be prepared to spend time simply setting up for alignment and other premeasurements. Location of materials laboratories in close proximity to a synchrotron is unusually advantageous.—PMB

global deforestation by G. M. Woodwell and others stated that, "appropriate action taken now might reduce or eliminate the problem. Stabilization of the rate of combustion of fossil fuels combined with a program of reforestation would contribute toward stabilizing the CO₂ content of the atmosphere... we need not accept as inexorable a global warming due to the accumulation of CO₂ in the atmosphere" (*Science*, 222, 1081-1086, 1983).

The conclusions may be correct, but the factors affecting the release of carbon dioxide into the atmosphere are complex. The levels of carbon dioxide in the atmosphere vary, following major seasonal pulses. In the northern hemisphere, spring and summer levels are lower than the average due to the uptake of plants in their growing cycle. The fall and winter seasons experience a major pulse of carbon dioxide from decaying leaves and plants. Superimposed on these pulses are changes such as those related to the rates of fossil fuel combustion and to a long list of natural seasonal phenomena.

To solve the problems of analyzing carbon dioxide effects, the natural CO₂ levels and trends in changes of those levels must first be established. It is necessary to obtain estimates of historic levels of carbon dioxide in the atmosphere, and to determine increases relative to some base. According to the report by Woodwell et al., "The increase in the CO₂ content of the atmosphere over the 120 years since 1860 exceeds 15 percent; it may be as much as 30 percent." And a report about the carbon cycle by R. A. Kerr, concluded that, "The ultimate aim of carbon cycle research is to predict how the concentration of carbon dioxide in the atmosphere will vary as humankind pumps more and more of it into the atmosphere... Note of these models yet duplicates the present well enough to attempt predicting the future" (*Science*, 222, 1107-1108, 1983).

Among the many factors being considered in carbon dioxide/atmosphere studies, several points are noted. One is that deforestation will not be a problem if its rate continues. Forests will have disappeared by the first half of the 21st century. This might be considered an example of a change of critical factor, as would the start of reforestation. Other examples include saturation of carbon dioxide in the oceans and release of carbon dioxide from the earth's surface due to global warming. In each case, a contributing factor would suddenly cease to exist.

The interrelations of the many factors affecting carbon dioxide levels are hard to decipher, but the reasons for attempting it are clear. Woodwell et al. state: "Recent rates of accumulation of CO₂ have been high enough to produce, if continued... approximately twice the amount thought to have been present in 1900." Very soon, therefore, global warming trends that could cause the shift of climatic zones, the displacement of agriculture, the disruption of major vegetation zones, and the rise of sea level by 5 m could occur.—PMB

OTA Congressional Fellowship

The Office of Technology Assessment (OTA) is seeking qualified candidates from academia, industry, and government for its Congressional Fellowship Program for 1984-1985. The program, similar to AGU's Congressional Fellowship Program, provides an opportunity for individuals who have demonstrated outstanding ability to gain a better understanding of science and technology issues facing Congress and the ways in which Congress establishes national policy related to these issues.

OTA will select up to six fellows for a 1-year program, to begin September 1984 on Capitol Hill. The fellowship is open to men and women of all disciplines who have demonstrated exceptional competency in the physical or biological sciences, engineering, law, economics, environmental and social sciences, or public policy. Candidates must have completed research and training at the doctoral level or have equivalent experience, as judged by the OTA selection committee. Salaries for successful candidates will range from \$25,000 to \$41,000 per year, based on the fellow's current salary and/or training and experience.

Fellowship applicants are required to submit a resume (up to two pages) that lists education, experience, areas of special interest; a one-page list of published works; three letters of reference; and a statement of principal expectations of the fellowship program and expected contributions to OTA during the program. For additional information, write to Congressional Fellowships, Personnel Office, Office of Technology Assessment, Congress of the United States, Washington, DC 20510. Applications for the fellowship and letters of reference should be sent to the above address no later than February 3, 1984. Letters of recommendation should be sent directly to OTA.—BTR

AGU MEMBERS

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In Congress

USGS Budget Set

In fiscal 1984, the U.S. Geological Survey (USGS) is budgeted for a 2.3% increase in funding over fiscal 1983. Although the fiscal year began on October 1, the Department of Interior appropriations bill, which includes the USGS budget, was not signed into law until nearly a month later. Here is a summary of the program-level funding for the USGS. The program level represents the actual money—including money from the federal treasury, residual funds, transfers, etc.—available.

Table 1 compares USGS funding for fiscal 1983, the Reagan request for fiscal 1984, and the final fiscal 1984 program levels based on the conference completed on September 29 between the House and Senate appropriations committees. The USGS is budgeted for

\$409.9 million in fiscal 1984, including \$24 million in residual funds for the National Petroleum Reserve in Alaska (NPR).

Some differences between 1983 and 1984 funding for the activities and subactivities reflect changes in categorization of programs that accompanied recent budget streamlining. Nevertheless, the fiscal 1984 budget mirrors some internal refocusing of priorities. For example, there is an 11% increase in fiscal 1984 for both the water resources investigations activity (with the federal program of the national water data system getting a 23% boost) and for the National Mapping Program. The offshore geologic surveys subactivity will receive a 20% increase and the mineral resource surveys subactivity has gotten better than a 9% boost. Designated for decreases are the subactivities for energy hydrology (down 21%) and energy geologic surveys (down 12%).

The USGS budget is part of the Department of Interior appropriations bill (H.R. 3363), which was signed into law by President Reagan on November 4.—BTR

TABLE 1. USGS Fiscal 1984 Budget Status, Program Levels, in Millions of Dollars

Activity	FY 1983	Reagan FY 1984 Proposal ¹	Final Conference FY 1984 ²
Geologic and Mineral Resource Surveys			
Geological hazards	51.6	40.7	51.4
Land resource surveys	16.8	16.7	17.2
Mineral resource surveys	41.1	45.3	41.9
Energy geologic surveys	34.2	25.5	30.1
Offshore geologic surveys	15.5	13.7	18.6
Subtotal	159.2	141.9	162.2
Water Resources Investigations			
National water data system:			
federal	54.2	55.4	66.6
National water data system:			
federal-state cooperative program	15.8	47.1	39.1
Energy hydrology	15.1	9.6	11.9
Subtotal	115.1	112.1	127.6
National Mapping Program	81.1	77.9	90.1
Facilities	9.0	13.2	10.4
General Administration	14.9	14.2	15.5
Total, USGS	399.9³	365.5⁴	405.9⁵

Source: USGS. Numbers may not total because of rounding.

¹See *Eos*, February 15, 1983, p. 65.

²Signed into law (P.L. 98-116) on November 1. Based on a conference completed September 29 between the House and Senate appropriations committees. See *Eos*, September 13, 1983, p. 518.

³Includes \$11.1 million for earth science applications, which was a separate activity in fiscal 1983. It now falls into the surveys and investigations activities. Total also includes \$6.4 million for the Barrow area gas program.

⁴Does not include money for National Petroleum Reserve in Alaska (NPR). Total also includes \$6 million for digital cartography, which had previously been included with National Mapping Program.

⁵Includes \$24 million from residual funds for NPR.

WaterWatch

WaterWatch
Area of the hydrology section.

Editors Mary P. Anderson, Department of Geology and Geophysics, University of Wisconsin-Madison, Madison, WI 53706 (608-262-2365).

Welcome to WaterWatch

The President's Views on Accreditation of Hydrologists

With this issue we inaugurate WaterWatch, which is intended to bring news of water and of AGU's Hydrology Section to all readers of *Eos* at least every 3 months. One member of each of the Hydrology Section's technical committees is serving as a topic reporter, feeding information to Mary Anderson, editor of *Eos* for hydrology, but that is not enough. Quarterly publication of a substantial feature will require the active participation of many more. I appeal to all members of the Hydrology Section to provide Mary Anderson with newsworthy items.

As Section President I plan to use WaterWatch as my primary means of communicating with the membership. Let me begin now with a brief statement on an issue of considerable interest to many of us, the accreditation of professional hydrologists and professional hydrogeologists.

As most of you know there is an active movement to create a mechanism for accreditation of hydrogeologists. The motivation for this movement appears to be twofold: (1) protection of the public from unqualified practitioners; and (2) certification of the qualifications to practice of those whose hydrogeologic training does not match the requirements for registration as a Professional Engineer or as a Professional Geologist. Both motivations are laudable, but both stem from the needs

of professional practice while the American Geophysical Union is a research organization. For this reason the Section Executive Committee decided (*Eos*, September 13, 1983, p. 554; December 27, 1983, p. 1095) not to involve the AGU in this certification movement, feeling that this is more properly a role for an organization such as the American Society of Civil Engineers. At the same time we urge each member to decide individually whether or not to participate.

While this decision may seem arbitrary to many, particularly to those members whose interests lie primarily in the application rather than the creation of hydrologic knowledge, it is consistent with the efforts of the last several years on the part of the AGU Hydrology Section leadership to improve the image and status of hydrology among our colleagues from the other sections of the Union. Many of the important geophysical problems of tomorrow will require active cooperation of earth scientists from many sections of AGU (I think immediately of the question of climate variability) and to handle these problems together will require a firm basis of mutual scientific respect. Building this respect for hydrology, through the AGU journal *Water Resources Research*, through the nature and quality of our technical sessions, and through gaining Union recognition for our most distinguished members, continues to be my primary goal, as your President.

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(cont. on p. 10)



Transactions, American Geophysical Union
No. 1, January 3, 1984

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Vol. 65, No. 1, Pages 1-8

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GENERAL: The CSIRO Marine Laboratories, which include the Division of Oceanography and the Division of Fisheries Research is Australia's principal marine research institution, employing over 200 scientists and support staff investigating the physical, chemical and biological features, including fisheries, of the oceans around Australia.

Two chartered vessels (53m and 43m) are used for research and a modern oceanographic vessel is being built to replace the 43m vessel. The Marine Laboratories have a VAX 11/750 computer, and on-line access to a Cyber 78 computer is available.

NOTES: Laboratories are nearing completion in Hobart.

DUTIES: The appointees will initiate and conduct research into the dynamics of the ocean, and will be expected to develop interest in processes and phenomena relevant or applicable to the Australian regional economy, such as, straits, or continental shelves. Depending upon suitability, appointees may be required to lead groups and develop new research initiatives within Divisional programmes. One appointee may be expected to direct particular interest to the Australian Northwest Shelf region.

QUALIFICATIONS: A PhD degree or equivalent qualifications with extensive experience and substantial evidence of original research achievement in the field of physical oceanography, or a closely related geophysical discipline. Applicants should preferably have had substantial experience and success in the design and conduct of offshore oceanographic experiments, and the interpretation of their results in relation to available theory and applications, and/or substantial success in the development and validation of theoretical models of ocean or atmospheric dynamics, and a combination of analytical and numerical expertise.

TECHNICAL: Experience with Australian Government superannuation benefits available.

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University of Wisconsin-Madison/Tenure Track Position. The Department of Geology and Geophysics invites applications for an anticipated tenure-track position at the assistant-professor level in applied geomorphology and hydrogeology commencing in August 1984. The applicant should be committed to developing a strong research program in geomorphology and hydrogeology, and in some aspects of engineering and environmental geology. The Ph.D. is required. Applicants with course work in engineering and an interest in the field application of geologic principles are especially encouraged to apply.

Send letter of application outlining your professional goals, transcripts, resume, copies of publications, and three letters of reference to: David M. Mickelson, Department of Geology and Geophysics, Weill Hall, University of Wisconsin, Madison, WI 53706.

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Center for Ocean-Atmosphere Interactions Department of Meteorology, University of Maryland, College Park, MD. The Department of Meteorology at the University of Maryland has established a center to study the interactions of ocean, atmosphere, and land processes and their impact on climate variability, and in particular to study the feedbacks of dynamical processes of short-term climate fluctuations. Applications are invited from qualified scientists to the center at its inception. The center has openings for two initially self-sustained tenure line positions at Assistant/Associate Research Scientist level, one Research Scientist, one Research Associate, and three Faculty Research Assistants. Qualifications for these positions are described below.

1. *Assistant or Associate Professor:* One tenure line position in Ocean-Atmosphere Interactions. The applicant should have a PhD in Meteorology and Oceanography, and should have demonstrated his ability to carry out outstanding research on Ocean-Atmosphere Interactions. Contributions to the study of atmospheric variability using either simple models or complex GCMs would be considered desirable.

2. *Assistant or Associate Professor:* One tenure line position in Ocean-Atmosphere Interactions. The applicant should have a PhD in Meteorology and Oceanography, and should have demonstrated his ability to carry out outstanding research on Ocean-Atmosphere Interactions. Contributions to the study of atmospheric variability using either simple models or complex GCMs would be considered desirable.

3. *Assistant or Associate Professor:* One tenure line position in Ocean-Atmosphere Interactions. The applicant should have a PhD in Meteorology and Oceanography, and should have demonstrated his ability to carry out outstanding research on Ocean-Atmosphere Interactions. Contributions to the study of atmospheric variability using either simple models or complex GCMs would be considered desirable.

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5. *Research Associate:* One position for one year with possibility of extension for the second year. The applicant should have a recent Ph.D. with interest in studying the dynamics of quasi-stationary atmospheric anomalies either by analysis of observed data or by analysis of model simulations.

6. *Faculty Research Assistant:* Three positions (two modeling and one for data analysis). The applicants should have at least M.S. in Meteorology and demonstrated their ability to work with large models and high speed computers. They should also have good understanding of synoptic and dynamic meteorology, and familiarity with modern techniques of processing large volumes of data.

Letters of application should be sent to:
J. Shukla, Chairman
Search Committee
Department of Meteorology
University of Maryland
College Park, MD 20742

Applications should include a curriculum vitae and names of three references. Applications received before March 15, 1984, will receive full consideration.

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University of Georgia/12-month tenure-track faculty appointment in the School of Forest Resources. Qualifications: Ph.D. in hydrology or forest hydrology with at least one degree in forest resources. Background should include forest resource management and quantitative sciences. Responsibilities: Teach undergraduate and graduate level courses in forest hydrology and watershed management. Develop a research program in an appropriate area of forest hydrology. Rank: Assistant or Associate Professor, commensurate with qualifications. Salary: Commensurate with training and experience. Position available: July, 1984. Applications: All applications must be postmarked no later than February 1, 1984. Submit resume, transcripts, and names of at least three references to:

Klaus Steinbeck, Chairman
Hydrology Search Committee
School of Forest Resources
University of Georgia
Athens, GA 30602
Telephone 404-542-1576

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Summer Assistantships/National Astronomy and Ionosphere Center. NAIC will be conducting a Summer Student Program at the Arecibo Observatory in Puerto Rico. Areas of interest include Astrophysics, Planetary Radar Astronomy, Radio Astronomy, Electronics and Computer Science. The assistantships are normally for 10 weeks with the starting date being flexible. Graduate students and undergraduates who have completed at least three years of undergraduate training as of next summer are eligible. Travel costs to and from Puerto Rico will be paid by NAIC. Applications for all assistantships must be submitted by February 1, 1984, are available from the Office of the Director, NAIC, Space Sciences Building, Cornell University, Ithaca, New York 14853.

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Applied Geophysics/Bolling Green State University. The Department of Geology invites application for a tenure-track assistant professor position in Applied Geophysics to begin September 1984. Ph.D. required. The successful candidate will be expected to develop a research program in some aspect of Applied Geophysics and to teach in the Department of Geology. The position is in the Department of Geology, University of Maryland, College Park, MD 20742. Salary commensurate with qualifications. Send resume, transcripts, and three letters of reference to: Charles M. Oriskany, Chairman, Search Committee, Department of Geology, Bolling Green State University, Bolling Green, DC 20316.

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Geophysics/Tectonophysics/University of Wyoming. Applications are invited for a tenure-track position at the Assistant Professor level in the Department of Geology and Geophysics. Candidates should have a Ph.D. in Geophysics or Tectonophysics, and should have demonstrated their ability to work with large models and high speed computers. They should also have good understanding of synoptic and dynamic meteorology, and familiarity with modern techniques of processing large volumes of data.

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University of Washington/Geophysics—Research Faculty Positions. Applications are invited for two or three openings for research faculty. Individuals are to establish innovative and high-quality research programs and to obtain funding to maintain those programs. Candidates should have a Ph.D. in Geophysics or Tectonophysics, and should have demonstrated their ability to work with large models and high speed computers. They should also have good understanding of synoptic and dynamic meteorology, and familiarity with modern techniques of processing large volumes of data.

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The University of Maryland subscribes to a policy of equal educational and employment opportunity. The University of Maryland, under Title IX of the Education Amendment of 1972, does not discriminate on the basis of sex in admission, treatment of students, or employment.

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Mineralogy/Petrology/Geochemistry—South Dakota School of Mines. A position of Research Scientist I (research equivalent of assistant professor) is currently available in the Institute for the Study of Mineral Deposits (ISMD) at the South Dakota School of Mines and Technology, Rapid City, South Dakota. A Ph.D. degree in the general area of mineralogy-petrology-geochemistry is required and the Ph.D. degree must be in hand before assuming the position with ISMD. The successful applicant will interact with the several research programs conducted by ISMD with special emphasis on the mineral deposits of the Black Hills, South Dakota. Major research responsibilities will include: (1) field work in the depth study of stratiform gold deposits in the Black Hills. ISMD has a fully automated (WDS + EDS) microprobe and a new state of the art automated atomic absorption spectrometer with inductively coupled plasma torch (AAS/ICP) for major, minor and trace element analysis. Arrangements are in place for neutron activation analysis (Battelle, Richland, Washington) and light stable isotope analysis (U.S.C.S.).

Candidates for the position should send resumes and three letters of recommendation to:

J.J. Papke, Director, ISMD
South Dakota School of Mines and Technology
500 East St., Joseph St.
Rapid City, South Dakota 57701-3095
For additional information, call (605) 304-0152.

SDSMT is an affirmative action/equal opportunity employer.

University of Iowa/Faculty Positions. The Department of Physics and Astronomy anticipates two openings for tenure-track assistant professors or visiting faculty at any level in August 1984. In exceptional cases, tenure or tenure-track appointments at the associate professor or professor level will be considered. Preference for one position will be given to an experimentalist in intermediate to high energy physics. Current research interests in the department are radio and optical astronomy and the following specialties in physics: atomic, condensed matter, elementary particle, laser, nuclear, plasma, and solid state physics. Duties include undergraduate and graduate teaching, guidance of research students and personal research. Interested persons should submit a resume and a statement of research interests and arrange for three letters of recommendation to be sent to Search Committee, Department of Physics and Astronomy, The University of Iowa, Iowa City, IA 52242.

The University of Iowa is an equal opportunity/affirmative action employer.

ENDOWED PROFESSORSHIP IN NUMERICAL HYDROLOGY

The University of Alabama is pleased to announce the establishment of an Endowed Professorship in Numerical Hydrology in the Department of Civil Engineering. Nominations and applications are invited for this key position of leadership. The holder of the Professorship will be expected to provide leadership in research, graduate teaching and interchange of ideas with other departments and research entities on and off-campus. Applicants should have a doctor's degree in an appropriate area and must have demonstrated leadership abilities in the research areas of numerical and/or statistical hydrology, urban hydrology, river and coastal engineering, migration and dispersion of hazardous wastes, geothermal hydrology, real time hydrologic forecasting. Registration as a professional engineer is desirable. Nominations and applications with names and addresses of three references should be sent to:

Assistant Dean Gary C. April, College of Engineering
THE UNIVERSITY OF ALABAMA
P.O. Box 1968
University, Alabama 35488
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DIRECTOR CENTER FOR EXPLOSIVES TECHNOLOGY RESEARCH

The Rio Grande Research Corridor Initiative of the State of New Mexico is part of a major effort to enhance high-technology economic development in the State by building upon an existing base of research and development capabilities. The Corridor, extending 300 miles along the Rio Grande River Valley from Los Alamos to Las Cruces, is host to five major federal laboratories and three state-supported doctoral-granting universities. As part of this economic development effort, the State has funded establishment of centers of technical excellence at the universities, one of which is the Center for Explosives Technology Research at the New Mexico Institute of Mining and Technology. State funding for the Center for Explosives Technology Research is \$1.3 million for the present fiscal year and is projected at \$8.5 million over a five-year startup period.

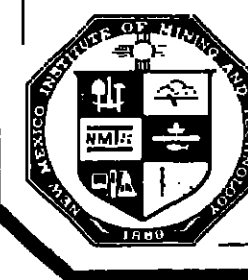
The Center's mission is to conduct basic and applied research focused on the application of high-energy-rate technology to materials and processes, to develop new techniques and processes suitable for industrial application, and to work with industry in joint ventures to effect the transfer of this technology to the private sector. Interdisciplinary programs will involve areas such as shock physics and chemistry, explosives formulation and characterization, metallurgical processes of high-energy-rate fabrication, computer modeling, high-velocity impact phenomena, and the controlled fracture and fragmentation of materials. The Center will draw on resources from existing programs in the departments of Metallurgical and Materials Engineering, Mining Engineering, Physics, Geophysics, Chemistry, and Mathematics. Additional expertise and facilities are available from the Terminal Effects Research and Analysis Group, which operates a complex of field sites dedicated to explosives research and testing in a 12-square-mile facility adjacent to the campus, and from cooperation with the Los Alamos and Sandia National Laboratories, as enabled by the Stevenson-Wylder Technology Innovation Act of 1980.

A senior scientist with outstanding credentials in research and administration is being sought to direct the Center. This is a full-time, 12-month, joint appointment as a senior research scientist in the Research Division and as a full professor in an appropriate department of the College Division. As Director, this individual will be responsible for development of the Center as a world-class organization for research, technological development, and graduate instruction. The Director will oversee the development of staff and facilities, will coordinate efforts of the Center with other related activities within the Institute and with the National Laboratories and other members of the Rio Grande Research Corridor community, and will assure an aggressive program of research and cooperative ventures with industry.

The position requires an individual with an outstanding record of research in a related field and with demonstrated abilities in the development of major research programs. Leadership qualities and ability to organize and manage research-and-development partnerships with industry are essential. Salary will be competitive with comparable positions in both the public and private sectors. Nominations and applications, with curriculum vitae and three references, should be submitted before 15 February 1984 to:

CETR Search Committee
c/o Research and Development Division
New Mexico Institute of Mining
and Technology
Campus Station
Socorro, NM 87801

New Mexico Institute of Mining and Technology
an Affirmative Action Equal Opportunity Employer



Microprobe Technician/South Dakota School of Mines and Technology. Applications are invited for a position as microprobe technician for the Institute for the Study of Mineral Deposits. The microprobe is an ETEC (MAC-5) with 3 spectrometers with EDS, WDS and quantitative PCT. The position will require field work on ore deposits and in the microprobe laboratory. The successful applicant will be responsible for the day-to-day operation of the instrument including maintenance and repair of hardware, development of software, and analysis of mineral and rock samples. A background in electronics is required. Salary commensurate with experience and qualifications. Applicants should send a resume and three letters of recommendation to: J.J. Papke, Director, Institute for the Study of Mineral Deposits, South Dakota School of Mines and Technology, Rapid City, South Dakota 57701-3095. Closing date: February 31, 1984. For additional information, call (605) 304-0152.

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Dr. Steven D. Scott
Department of Geology
University of Toronto
Toronto, Ontario
Canada
M5S 1A1

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Geophysicist Position/University of Colorado, Boulder. The Department of Geological Sciences, University of Colorado, Boulder, invites applications from geophysicists for appointment to a tenure-track faculty position. Applicants' research interests should be in some aspect of crustal deformation, with emphasis on the use of modern geodetic techniques for the solution of geodynamic problems. The successful applicant will have opportunities for collaboration with strong research groups in the Cooperative Institute for Research in Environmental Sciences (CIRES) and the Joint Institute for Laboratory Astrophysics (JILA) of the University. This faculty member is expected to contribute to the undergraduate and graduate instructional programs by teaching courses in theoretical and/or applied geophysics, as well as assisting in the teaching of courses for non-science majors. The appointee is expected to maintain a vigorous research program, which will include the direction of graduate students in the geophysics program. Applicants must have received a Ph.D. degree and preference will be given to those with one or more years of productive post-doctoral experience. This position will be filled at the assistant professor level. The academic year salary range is \$22,000 to \$30,000.

The closing date for applications is September 1, 1984. The application should include a complete curriculum vitae with publication list and citations of important past research, and a statement of research and teaching interests. The applicant should arrange for four letters of reference to be sent directly to the Search Committee. Apply to: Geophysics Search Committee, Attention: Fifth Floor, Department of Geological Sciences, University of Colorado, Campus Box 250, Boulder, CO 80309. The University of Colorado is an equal opportunity/affirmative action employer.

